

The Federal Congress is now seriously discussing the problem. Certainly, so far as California is concerned, it is important that the Federal Government and also the various states concerned (for example, Oklahoma, Arkansas, Texas, Arizona and California) should make of the subject a careful study, especially as regards the social welfare, medical, economic and other elements involved. In a recent comment from the California State Board of Public Health, its director, Dr. W. M. Dickie, called attention to the fact that health services to migrants who had come to California are divided among these agencies: (1) The State Department of Public Health; (2) Local Public Health Departments; (3) The Agricultural Workers Health and Medical Association; (4) State Relief Administration; (5) county welfare departments; and (6) county hospitals.

Doctor Dickie also stated:

As long as both interstate and intrastate migrations continue at near the present value, it will be necessary for federal, state, and local governments to spend a considerable amount of money to protect the public health from dangers created by the existence of a large number of homeless, indigent, and semi-indigent wanderers.

It is to be hoped that a satisfactory solution will be found for this problem.

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Proposed Federal Law That Would Give Chiropractors the Right to Treat Injured Federal Employees.—On March 23, word was received at the headquarters office in San Francisco that Congressman John H. Tolan of the Seventh District had introduced House Resolution 8963 (H. R. 8963) at Washington, and that the bill had been referred to the Committee on Judiciary of the House of Representatives. It is stated that the measure proposes to give chiropractors the right to treat injured Federal employees who would be entitled to benefits under the United States Employees' Compensation Act.

It is to be assumed that if such a law were enacted, its provisions could apply only in those commonwealths in which chiropractors have the right to practice and to only such extent as the respective state laws permitted chiropractors to treat patients. Members who are interested should write to their local Congressman or to the sponsor of the measure, Congressman John H. Tolan, Washington, D. C., for a copy of the bill. The measure should be studied and its course watched.

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Essay Contest for High School Students: Under the Sponsorship of the Committee on Public Health Education of the California Medical Association.—Attention of component county societies and members of the Association is directed to the communication received from Dr. Samuel Ayres, Jr., chairman of a subcommittee of the Committee on Public Health Education (Special Assessment Committee), in which is outlined a plan for an essay contest for high school students, the topic being "The Rôle of the Doctor of Medicine in the Life and Health of the American

Citizen," the letter of Doctor Ayres appearing in this issue on page 196.

In due course, the county medical societies will receive detailed information and it is to be hoped in their respective districts members of the medical profession will give fullest possible coöperation in calling the attention of school authorities to the advantages to be derived by those who participate in such an essay contest.

The plan as outlined should meet with a hearty response by high school teachers, and be productive of stimulating thought among those students who are in classes making them eligible. Concerning this, more anon.

Other State Association and Component County Society News.—Additional news concerning the activities and work of the California Medical Association and its component county medical societies is printed in this issue, commencing on page 181.

EDITORIAL COMMENT†

EXPERIMENTAL THERAPY OF GRAM-POSITIVE INFECTIONS

Demonstration that aqueous extracts of the Dubos bacillus will protect mice against a million lethal doses of highly virulent pneumococci, is one of the most encouraging research leads of recent decades. The underlying philosophy of this therapy is presumably applicable to numerous other specific infections.

It can be deduced from philosophical grounds that there must be present in nature enzymes capable of destroying each and every organic chemical compound capable of synthesis by plant, animal, or microbic forms. Every specific infectious agent, therefore, must have its natural antidote, presumably in the intracellular enzymes of environmental saprophytes. Stimulated by this philosophy, several years ago the Rockefeller Institute began a systematic survey of environmental saprophytes in the hope of finding some of practical therapeutic value. Their first search was for soil bacilli capable of utilizing the specific capsular polysaccharide (or "hemicellulose") of type pneumococci. Numerous soil samples were inoculated into differential culture media, in which the pneumococcus polysaccharide was the only available source of carbon. Several cellulose-decomposing bacilli were thus found by Dubos and Avery¹ which were capable of decapsulating the corresponding type pneumococcus.

From the most successful of these the endocellular enzymes were extracted by autolysis. These enzymes, found capable of hydrolysing Type III

† This department of CALIFORNIA AND WESTERN MEDICINE presents editorial comments by contributing members on items of medical progress, science and practice, and on topics from recent medical books or journals. An invitation is extended to all members of the California Medical Association to submit brief editorial discussions suitable for publication in this department. No presentation should be over five hundred words in length.

¹ Dubos, René J., and Avery, O. T.: J. Exper. Med., 54:51, 1931.

capsular polysaccharide *in vitro*, did not attack Type I or Type II pneumococci, nor any other bacterial polysaccharide of nonpneumococcal origin. It was found that they would protect mice² and rabbits³ against experimental infections with homologous pneumococci, and exerted a curative effect on infections already established in these animals. Therapeutic effects were apparently due solely to decapsulation of the pneumococci, rendering them more susceptible to phagocytosis. The living bacterial cell was apparently not seriously injured.

In order to find less highly specific enzymes of greater clinical promise, ones that would directly attack the cytoplasm of pathogenic bacteria, Dubos⁴ then resorted to a very ingenious different technique. Soil samples obtained from numerous sources were pooled, kept at about 70 per cent of their natural moisture-holding capacity, and incubated at 30 degrees centigrade until most of the organic matter they contained was destroyed. Staphylococci, streptococci, and pneumococci suspended in distilled water were then added at irregular intervals to each pooled sample to supply new organic nutriment. At the end of two years' selective propagation at the expense of these Gram-positive cocci, the mixed bacterial flora in each sample was tested for its lytic action on living staphylococci. Lysis was observed in these mixed tests, the staphylococci being completely destroyed within forty-eight hours.

By routine plating methods it was eventually found possible to isolate the essential lytic saprophyte from the mixed flora. This microorganism proved to be a large, motile, spore-bearing bacillus, which in young cultures is Gram-positive, but in older cultures appears as Gram-negative rods. The essential lytic factor is set free from the young culture at the time of this change, which is presumably the initial stage of autolysis. The active principle thus set free is precipitated quantitatively in the presence of dilute acid (p^H 4.5), and is readily redissolved in neutral solutions. Thus partially purified, it exhibits all of the lytic properties of the original culture. The initial product so obtained gives all of the protein tests and contains about 15 per cent nitrogen.

This initial product, tested in a 1:10,000 dilution, exerts a bactericidal effect on all types of staphylococci, streptococci, and pneumococci thus far tested. Higher dilutions are bacteriostatic. Acid-fast bacilli have not yet been studied. The lytic agent is apparently Gram-specific, being ineffective against *E. coli*, *H. influenzae*, and all other Gram-negative bacilli thus far tested. A single intra-abdominal injection of two milligrams of this initial product is sufficient to protect mice against concurrent infection with 10,000 lethal doses of virulent pneumococci. Three consecutive treatments, at twenty-four-hour intervals, furnished adequate protection against 1,000,000 lethal doses. This protection is effective against all types of

pneumococci. Control mice infected with Gram-negative *Klebsiella pneumoniae* are not protected.

Tests of the curative rather than prophylactic effect were made by delaying treating for several hours after experimental inoculation. It was found that a delay of five hours had very little effect on the therapeutic value. A seventeen-hour delay, however, did appreciably reduce therapeutic efficiency. Even with this delay, however, about 50 per cent of the experimentally infected mice survived the infection. Also, 100 per cent of the untreated controls died within forty-eight hours.

Dubos emphasizes the fact that these prophylactic and therapeutic effects were secured with the relatively crude product obtained by initial acid precipitation. Since making these tests, a purified protein-free form of the bactericidal agent has been prepared. Preliminary tests indicate that this purified product is from fifty to one hundred times more effective, both *in vitro* and *in vivo*. Since this purified product is protein-free, it presumably would not give allergic reactions. No attempts have thus far been made, however, to test its efficiency in human medicine.

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NATURE OF THE MELANOMA*

Although the neurogenic nature of the melanoma ("mole" or "pigmented nevus") has been satisfactorily established, this fact has failed to attract as much attention as it deserves.

The rival hypotheses of epithelial and fibroblastic origin of the melanoma were a subject of controversy for many years, without a decisive victory for either side. The main difficulty lay in the unique cellular structure of the melanoma, which is unlike any normal tissue in mammalian histology.

Soldan, in 1899, made the first important discovery of their neurogenic nature by demonstrating nerve fibers in melanomas. Bearing in mind the frequent pigmentation of the skin seen in neurofibromatosis, he postulated "pigmented moles" as one of the manifestations of von Recklinghausen's disease. Soldan's views, however, were either ignored or rejected until 1926, when Masson confirmed the presence of nerve fibers in the melanomas, and also noted some resemblance between the cells of melanomas and those of the Meissner and Merkel tactile corpuscles in the human skin.

In 1933, Laidlaw and Murray produced conclusive proof by showing that, microscopically, cutaneous melanomas are faithful reproductions of the tactile receptors of the amphibians and reptiles; these receptors are pigmented spots, not unlike human "moles," and are best seen on the snouts of alligators. Their close relationship is further borne out by the identity of the pattern of ramification and termination of their nerve fibers.

Functionally, the mammalian hair is a successor to the reptilian "tactile spots." The consensus of opinion is that hair is only secondarily ornamental and protective—primarily, a hair and its follicle

² Avery, O. T., and Dubos, R. J.: *Ibid.*, 54:73, 1931.

³ Goodner, K., Dubos, René, J., and Avery, O. T.: *Ibid.*, 55:393, 1932.

⁴ Dubos, René J.: *Ibid.*, No. 11, Vol. 70, p. 1 (July), 1939.

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